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DIRECTIONS FOR PREPARING HERBARIUM SPECIMENS OF GRASSES.

Good specimens of grasses are less difficult to prepare than those of almost any other family of plants, yet few are commonly so poorly made. The following simple directions are offered in the hope of improving the condition of grasses sent to the Department of Agriculture for identification.

COLLECTING.

The specimens (except in the case of bamboos or other very large grasses) should be complete, showing underground parts, rootstocks or stolons if any, and the flowering parts, preferably as nearly mature as possible without shedding the spikelets. With bunch-grasses, like the western species of Agropyron, enough of the clump should be preserved to show the bunching habit. With smaller tufted grasses, like some species of Aristida, Panicum, or Eragrostis, the entire tuft or half of it may be preserved, or less if the tuft is very large, but in any case it should be preserved as a tuft, not pulled apart into single culms. In the case of robust grasses growing in clumps, like Tripsacum or some species of Andropogon, only a single culm can be brought within the limits of size for a specimen, but in this case the culm taken should be separated at the root, not cut off above ground. Any part of the plant that shows a particular habit or characteristic of the grass, such as running rootstocks in various species of Agropyron and the stolons and attached plants of *Bulbilis dactyloides* and the like, should especially be preserved. The old branching culms of the previous year of the Dichotomous group of Panicum, if collected in the vernal state, are characteristic of the various species and should not be detached. The earth adhering to the roots should be cleaned off as much as possible without injuring the specimen. This can be done by snapping the

finger against the roots, or by striking them sharply against a tree, a stone, or the foot. In the case of the grasses that grow in mud, like Zizania and some species of Panicularia, the roots should be washed if convenient; if not, as much mud as possible should be squeezed off in a fold of paper, and what still adheres should be removed when dried.

The standard size herbarium sheet is 11½ by 16½ inches, and specimens should always be prepared to come well within these limits—never longer than 16 inches. Tall plants should be bent in lengths of 12 to 14 inches in N or M shape, the angles being sharply bent and held in place by slips made of cardboard or old postal cards. Care should be taken in bending the culms not to bend at a node, for the nodes disjoint readily. The cardboard slips are cut 2 to 3 inches long and ½ to 1 inch wide, with a slit 1 to 2 inches long through the middle. One of these slipped over a bend holds the specimen firmly.

Stout plants, such as Tripsacum, species of Spartina or Erianthus, and the like, which can not be held by cardboard slips are easily held by a loose loop of twine. Plants which require but a single bend are usually better turned down from the top, but bushy topped forms, such as some species of Eragrostis, Aristida, and Hordeum, may be bent up from the base. Grasses with scabrous awns, like Hordeum, Elymus, and Sitanion, should be bent to a length of not more than 12 inches, for they will "crawl" more or less until permanently mounted. By following these suggestions plants 6 or 8 feet high may be made into neat specimens that can be handled without injury. A specimen too long for the herbarium sheet or pressing paper, with roots sticking out at one end and spikelets at the other, or a specimen with an unsecured bend and working itself out of the paper in all directions necessarily suffers in handling, and especially in sending through the mails.

DATA.

Having secured the specimen complete, its value is greatly enhanced by full data. These should always include: Date of collection; locality; the geographical position within the State or Territory with such accuracy that it may be located upon a map, referring to a town or some prominent topographical feature, such as a river, lake, or mountain; natural conditions under which the plant grows, as rocky woods, low moist woods, sterile knoll, sand dune, original prairie, "flatwoods," hammock, salt marsh, etc. The more this is amplified by notes on the soil and characteristic accompanying vegetation the more valuable are the data. In addition the habit of the plant should be noted when this is not shown by the preserved specimen; as, for example, whether the stem is erect, spreading, or prostrate; whether the blades are flat or involute (flat blades sometimes become involute in drying, changing the appearance of the plant); whether the panicle or spike is erect or

nodding. Such data should be recorded in the field when the specimen is collected. This takes but a moment and is of permanent value. These notes may be made on the folded sheet of paper in which the plant is placed, or, much better, especially if one is making a collection of grasses, the data may be entered in a notebook under a number corresponding to a number marked on the sheet or attached to the specimen. Plants submitted for identification should be accompanied by labels that may be attached to the mounted sheets. These labels should be 1⅞ by 4 inches, bearing in ink the data and the identification number.

A word about using numbers. Each collection should receive a separate number. Various collections designated by *a*, *b*, *c*, etc., should never be placed under a single number. Great confusion has been caused by the distribution of two or more species under one number. At best such mistakes will sometimes occur when two species resembling each other are collected at the same time and mistaken for one. When the mistake is discovered, one may add "½" to one form and interline the entry in the note book; for example, "342 *Panicum commutatum*, dry woods, etc.; 342½ *Panicum ashei*, with 342." It is much better for each collector to use a single continuous series of numbers year after year instead of beginning again at 1 each year, and to use only one series for all plants collected. This is no more trouble for the collector and avoids possible trouble and confusion to others. If the monographer cites *Smith* 157 under *Panicum polyanthes*, unless Smith has kept a single series his number 157 in some other herbarium may be found to be some other species or not a Panicum at all.

DRYING.

Having collected complete specimens and taken full data the specimens must be dried thoroughly. This is more easily accomplished with grasses than with almost any other plants. The sheet in which the plant is laid when collected, with its number or data written thereon, is laid on a "drier," commonly a sheet of blotting paper or bibulous carpet paper (folded newspapers answer the purpose very well), another drier is laid on top, a second specimen is placed on this, and so on until all the specimens are between driers. The pile is then strapped between slat-presses made for the purpose or between two boards, or a single board may be placed on top and a weight of 10 to 50 pounds added. In 12 to 24 hours the driers should be changed for fresh ones. Those taken out are dried in the sun or by a fire and replace the second lot at the next changing, and so on until the specimens all feel entirely dry. This will be only a few days with most grasses, but heavy-stemmed water grasses may take a week. The drying may be hastened by placing the pile in the sun, but in this case the driers should be changed

when the plants are taken in at night or they are likely to be discolored from "sweating." During these changes the plant remains upon the original sheet where it was placed when collected, and when dry these inner sheets with their specimens are tied in bundles between binder's boards or heavy pasteboards for storage or shipment.

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